Exhibit AA

Exhibit B-16

Invalidity of U.S. Patent No. 7,301,648 ("'648 Patent")[1] under Pre-AIA Section 102 or Section 103 in view of Intersense IS-600 Precision Motion Tracker ("Intersense IS-600")[2]

InterSense IS-600 was publicly available at least as of 1996. Plaintiffs assert a priority date of January 28, 2000 for the '648 Patent. Even assuming that the '648 Patent is entitled to this priority date, InterSense IS-600 qualifies as prior art under at least pre-AIA Sections 102(a) and (b) to the '648 Patent.

As described herein, the asserted claims of the '648 Patent are invalid (a) under one or more sections of 35 U.S.C. § 102 as anticipated expressly or inherently by InterSense IS-600 (including the documents incorporated into InterSense IS-600 by reference) and (b) under 35 U.S.C. § 103 as obvious in view of InterSense IS-600 standing alone and, additionally, in combination with the knowledge of one of ordinary skill in the art, and/or other prior art, including but not limited to the prior art identified in Defendants' Invalidity Contentions and the prior art described in the claim charts attached in Exhibits B-1 – B-31. With respect to the proposed modifications to InterSense IS-600, as of the priority date of the '648 Patent, such modification would have been obvious to try, an obvious combination of prior art elements according to known methods to yield predictable results, a simple substitution of one known element for another to obtain predictable results, a use of known techniques to improve a similar devices or method in the same way, an application of a known technique to a known device or method ready for improvement to yield predictable results, a variation of a known work in one field of endeavor for use in either the same field or a different one based on design incentives or other market forces with variations that are predictable to one of ordinary skill in the art, and/or obvious in view of teachings, suggestions, and motivations in the prior art that would have led one of ordinary skill to modify or combine the prior art references.

All cross-references should be understood to include material that is cross-referenced within the cross-reference. Where a particular figure is cited, the citation should be understood to encompass the caption and description of the figure as well as any text relating to or

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[1] Discovery in this case is ongoing and, accordingly, this invalidity chart is not to be considered final. Defendants have conducted the invalidity analysis herein without having fully undergone claim construction and a *Markman* hearing. By charting the prior art against the claim(s) herein, Defendants are not admitting nor agreeing to Plaintiffs' interpretation of the claims at issue in this case. Additionally, these charts provide representative examples of portions of the charted references that disclose the indicated limitations under Plaintiffs' application of the claims; additional portions of these references other than the representative examples provided herein may also disclose the indicated limitation(s) and Defendants contend that the asserted claim(s) are invalid in light of the charted reference(s) as a whole. Defendants reserve the right to rely on additional citations or sources of evidence that also may be applicable, or that may become applicable in light of claim construction, changes in Plaintiffs' infringement contentions, and/or information obtained during discovery as the case progresses. Further, by submitting these invalidity contentions, Defendants do not waive and hereby expressly reserve their right to raise other invalidity defenses, including but not limited to defenses under Sections 101 and 112. Defendants reserve the right to amend or supplement this claim chart at a later date, including after the Court's order construing disputed claim terms.

[2] The claim limitations described herein were disclosed by the Intersense IS-600 as of the earliest priority date of the '648 patent. For instance: IS-600 Mark 2 Precision Motion Trackers, INTERSENSE INC. https://www.udc.es/citeec/documentos/posicion3d.pdf ("Intersense IS-600 Ex. 1"); User Manual for IS-600 Mark 2 Plus Systems Firmware versions 3.1 and above, INTERSENSE INC. (2000), https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.478.1635&rep=rep1&type=pdf ("Intersense IS-600 Ex. 2"); and IS-600 Mark 2 Precision Motion Tracker (May 20, 2003), https://web.archive.org/web/20030520214925/http://intersense.com/products/prec/is600/ ("Intersense IS-600 Ex. 3").

describing the figure. Conversely, where particular text referring to a figure is cited, the citation should be understood to include the figure as well.

A. INDEPENDENT CLAIM 1

CLAIM 1	Intersense IS-600
[1.pre] A method comprising:	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, a method. No party has yet asserted that the preamble is limiting, nor has the Court construed the preamble as limiting. However, to the extent that the preamble is limiting, it is disclosed by Intersense IS-600. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*:

Exhibit B-16

CLAIM 1	Intersense IS-600

IS-600 Mark 2

- *Fast & Smooth performance*
- *6-DOF Motion Prediction*
- *Wireless SoniDiscs™*
- *Immune to Magnetic Interference*

IS-600 Mark 2 PLUS

- *Upgraded Pentium™ Processor*
- *State-of -the art Ultrasonics*
- *Improved Resolution & Off-axis Accuracy*
- *Four tracked stations at 180 Hz*

IS-600 Mark 2 Precision Motion Trackers

Robust 6 degree-of-freedom motion tracking for simulation and training.

The IS-600 Mark 2 line delivers high-fidelity 6 Degree-of-Freedom (6-DOF) position and orientation tracking without the issues associated with other tracking technologies. Utilizing a hybrid of inertial and ultrasonic sensing technologies, the IS-600 Mark 2 achieves performance and robustness superior to any single-technology tracking device.

Superior Accuracy and Robustness
The IS-600 family uses InterSense's SensorFusion software to obtain superior position and orientation resolution and stability. Position tracking performance is enhanced by combining inertial sensors with ultrasonic drift correction, resulting in vastly improved update rates, resolution, and immunity to environmental interference.

Fast and Jitter-Free
The InterSense IS-600 design virtually eliminates the lag and jitter common to other systems, thus overcoming issues that are the source of simulator sickness in immersive head-mounted display applications.

Motion Prediction
The IS-600 can predict angular & position motion up to 50 ms, compensating for graphics rendering delays and minimizing simulator lag.

Four Operating Modes
GEOS™ Mode: Gyroscopic Earth-Stabilized Orientation Sensing for smooth sourceless 3-DOF orientation tracking with internal update rates up to 500 Hz.

PULSAR™ Mode: Pulsed Acoustic Ranging provides 3-DOF ultrasonic position tracking. Can be configured to run either hard-wired or wireless.

DUAL Mode: 6-DOF orientation and position tracking. The sensors operate independent of each other.

FUSION Mode: The best 6-DOF orientation and position tracking, using sensor fusion algorithms to combine inertial and ultrasonic measurements.

Distortion-Free
InterSense's patented inertial sensing technology is not susceptible to the electromagnetic interference common in other tracking systems, allowing the IS-600 to deliver smooth, steady performance, even in noisy, metal-cluttered environments.

Installation Flexibility
The X-bar is modular in design with detachable ReceiverPods, allowing custom configurations such as inside auto and flight simulators.

IS-600 Mark 2 PLUS Features
The Mark 2 PLUS offers millimeter resolution, improved stability, and increased noise immunity from environmental interference.

The Pentium processor allows four fusion mode stations to track simultaneously at 180 Hz.

Hardwired SoniDiscs provide maintenance free operation with a battery powered option available for configuration flexibility.

INTERSENSE

Intersense IS-600 Ex. 1 at 1.

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CLAIM 1	Intersense IS-600

1.1 Hardware System Description

1.1.1 InertiaCube™ integrated inertial instrument

Both the sourceless orientation tracking and the hybrid 6-DOF tracking product configurations make use of an ultra-miniature smart sensor module called the InertiaCube. The InertiaCube is a monolithic part based on micro-electro-mechanical systems (MEMS) technology involving no spinning wheels that might generate noise, inertial forces and mechanical failures. The InertiaCube simultaneously measures 9 physical properties, namely angular rates, linear accelerations, and magnetic field components along all 3 axes. Micro-miniature vibrating elements are employed to measure all the angular rate components and linear accelerations, with integral electronics and solid-state magnetometers. The magnetometers are included for optional yaw drift correction in the sourceless inertial orientation mode only. The geometry and composition of these elements are proprietary, but the functional performance of the multisensor unit can be understood sufficiently by reference to the equivalent diagram in Figure 1.

Intersense IS-600 Ex. 2 at 6.

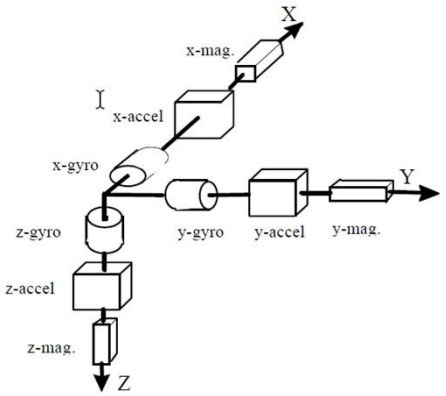

Figure 1: Functional diagram of InertiaCube

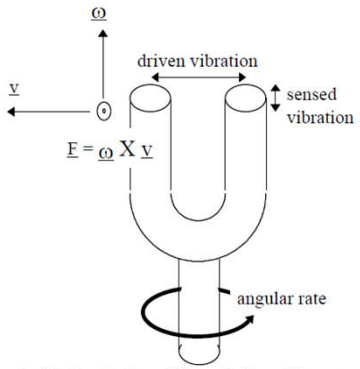

Figure 2: Principle of Coriolis vibratory gyroscope

Intersense IS-600 Ex. 2 at 7.

See also Defendants' Invalidity Contentions for further discussion.

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CLAIM 1	Intersense IS-600
[1.a] mounting a sourceless orientation tracker on a user's head,	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, mounting a sourceless orientation tracker on a user's head. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*:

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CLAIM 1	Intersense IS-600

IS-600 Mark 2

- *Fast & Smooth performance*
- *6-DOF Motion Prediction*
- *Wireless SoniDiscs™*
- *Immune to Magnetic Interference*

IS-600 Mark 2 PLUS

- *Upgraded Pentium™ Processor*
- *State-of -the art Ultrasonics*
- *Improved Resolution & Off-axis Accuracy*
- *Four tracked stations at 180 Hz*

IS-600 Mark 2 Precision Motion Trackers

Robust 6 degree-of-freedom motion tracking for simulation and training.

The IS-600 Mark 2 line delivers high-fidelity 6 Degree-of-Freedom (6-DOF) position and orientation tracking without the issues associated with other tracking technologies. Utilizing a hybrid of inertial and ultrasonic sensing technologies, the IS-600 Mark 2 achieves performance and robustness superior to any single-technology tracking device.

Superior Accuracy and Robustness
The IS-600 family uses InterSense's SensorFusion software to obtain superior position and orientation resolution and stability. Position tracking performance is enhanced by combining inertial sensors with ultrasonic drift correction, resulting in vastly improved update rates, resolution, and immunity to environmental interference.

Fast and Jitter-Free
The InterSense IS-600 design virtually eliminates the lag and jitter common to other systems, thus overcoming issues that are the source of simulator sickness in immersive head-mounted display applications.

Motion Prediction
The IS-600 can predict angular & position motion up to 50 ms, compensating for graphics rendering delays and minimizing simulator lag.

Four Operating Modes
GEOS™ Mode: Gyroscopic Earth-Stabilized Orientation Sensing for smooth sourceless 3-DOF orientation tracking with internal update rates up to 500 Hz.

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Distortion-Free
InterSense's patented inertial sensing technology is not susceptible to the electromagnetic interference common in other tracking systems, allowing the IS-600 to deliver smooth, steady performance, even in noisy, metal-cluttered environments.

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The X-bar is modular in design with detachable ReceiverPods, allowing custom configurations such as inside auto and flight simulators.

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The Pentium processor allows four fusion mode stations to track simultaneously at 180 Hz.

Hardwired SoniDiscs provide maintenance free operation with a battery powered option available for configuration flexibility.

INTERSENSE

Intersense IS-600 Ex. 1 at 1.

Exhibit B-16

CLAIM 1	Intersense IS-600

1.1 Hardware System Description

1.1.1 InertiaCube™ integrated inertial instrument

Both the sourceless orientation tracking and the hybrid 6-DOF tracking product configurations make use of an ultra-miniature smart sensor module called the InertiaCube. The InertiaCube is a monolithic part based on micro-electro-mechanical systems (MEMS) technology involving no spinning wheels that might generate noise, inertial forces and mechanical failures. The InertiaCube simultaneously measures 9 physical properties, namely angular rates, linear accelerations, and magnetic field components along all 3 axes. Micro-miniature vibrating elements are employed to measure all the angular rate components and linear accelerations, with integral electronics and solid-state magnetometers. The magnetometers are included for optional yaw drift correction in the sourceless inertial orientation mode only. The geometry and composition of these elements are proprietary, but the functional performance of the multisensor unit can be understood sufficiently by reference to the equivalent diagram in Figure 1.

Intersense IS-600 Ex. 2 at 6.

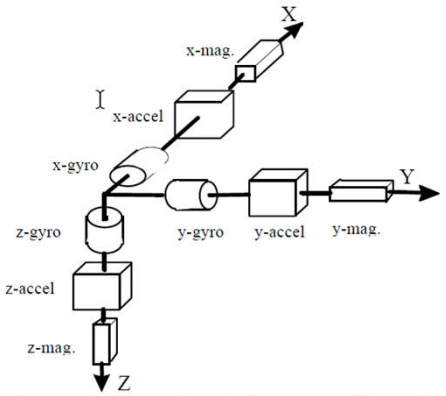

Figure 1: Functional diagram of InertiaCube

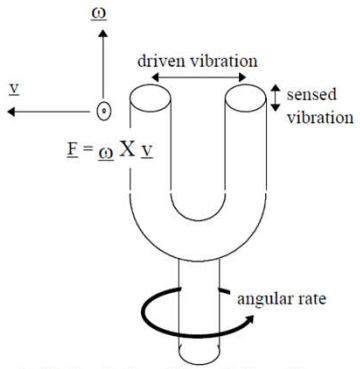

Figure 2: Principle of Coriolis vibratory gyroscope

Intersense IS-600 Ex. 2 at 7.

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CLAIM 1	Intersense IS-600

1.1.4 System Configuration

Figure 6 illustrates the configuration of the hybrid acoustic/inertial tracking system. The IS-600 hardware is essentially a superset of the IS-300 Series orientation tracking system, adding an ultrasonic range measurement system on top of the basic IS-300 Pro components. The drawing illustrates the IS-600 being used to track a helmet to which are attached an InertiaCube and two SoniDiscs. The rear SoniDisc has just received a trigger code matching its internal ID, and is in the process of emitting an omnidirectional acoustic pulse of 40 KHz energy. Only one SoniDisc is activated at a time.

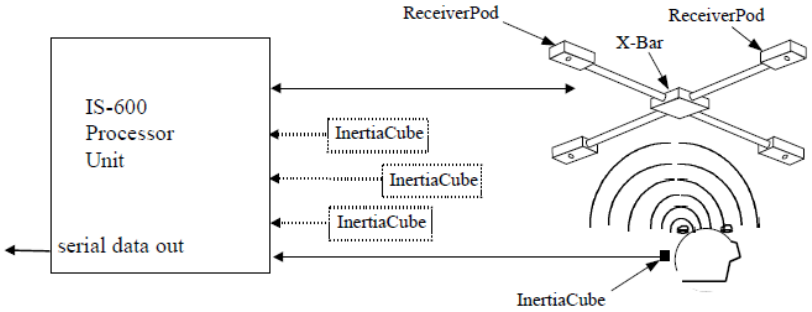

Figure 6: IS-600 HW diagram

The IS-600 has expansion capability up to 4 InertiaCubes and 8 SoniDiscs. Because these are packaged as separate modules, the user has the flexibility to configure the system for a very large variety of tracking tasks. The IS-600 also has several additional operating modes. These modes have different strengths and differing configuration requirements, as described in the following sections.

Intersense IS-600 Ex. 2 at 9.

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CLAIM 1	Intersense IS-600
	Perceptual Enhancement Level In order to provide the best performance for a large range of various applications, three levels of perceptual enhancement are available. None of the modes introduces any additional latency. 40 Mode 0 provides the best accuracy. The inertial tracker uses gyros to measure angular rotation rates for computing the sensor's orientation. To compensate for the gyroscopic drift, depending on the configuration, the tracker may use accelerometers, magnetometers or SoniDiscs to measure the actual physical orientation of the sensor. That data is then used to compute the necessary correction. In Mode 0 correction adjustments are made immediately, no jitter reduction algorithms are used. This results in somewhat jumpy output (not recommended for head tracking) but with lower RMS error. Use this mode for accuracy testing or for any application that requires best accuracy. Mode 1 provides accuracy similar to that of mode 0, with an addition of a jitter reduction algorithm. This algorithm reduces the accuracy by only a small amount and does not add any latency to the measurements. Mode 2 is recommended for use with HMD or other immersive applications. The drift correction adjustments are made smoothly and only while the sensor is moving, so as to be transparent to the user. Intersense IS-600 Ex. 2 at 40–41. *See also* Defendants' Invalidity Contentions for further discussion.
[1.b] using a position tracker comprising a radiated energy detector to track a position of a first localized feature	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, using a position tracker comprising a radiated energy detector to track a position of a first localized feature associated with a body part of the user other than the head relative to the user's head. In the alternative, this element would be

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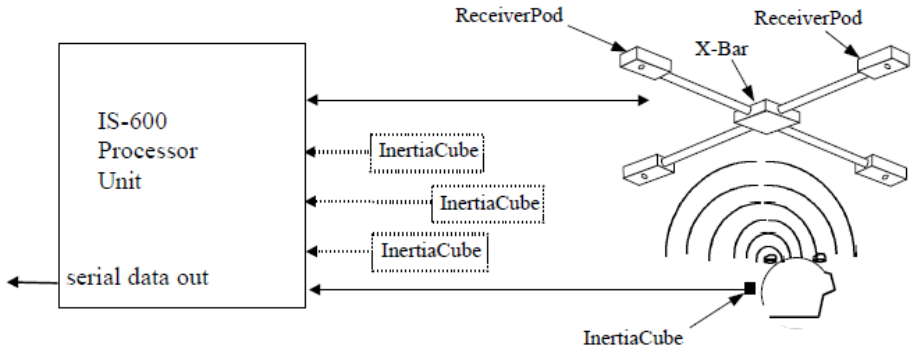
CLAIM 1	Intersense IS-600
associated with a body part of the user other than the head relative to the user's head; and	obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*: **1.1.4 System Configuration** Figure 6 illustrates the configuration of the hybrid acoustic/inertial tracking system. The IS-600 hardware is essentially a superset of the IS-300 Series orientation tracking system, adding an ultrasonic range measurement system on top of the basic IS-300 Pro components. The drawing illustrates the IS-600 being used to track a helmet to which are attached an InertiaCube and two SoniDiscs. The rear SoniDisc has just received a trigger code matching its internal ID, and is in the process of emitting an omnidirectional acoustic pulse of 40 KHz energy. Only one SoniDisc is activated at a time.  **Figure 6: IS-600 HW diagram** The IS-600 has expansion capability up to 4 InertiaCubes and 8 SoniDiscs. Because these are packaged as separate modules, the user has the flexibility to configure the system for a very large variety of tracking tasks. The IS-600 also has several additional operating modes. These modes have different strengths and differing configuration requirements, as described in the following sections. Intersense IS-600 Ex. 2 at 9. *See also* Defendants' Invalidity Contentions for further discussion.

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CLAIM 1	Intersense IS-600
[1.c] generating data representative of the tracked position.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, generating data representative of the tracked position. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*:

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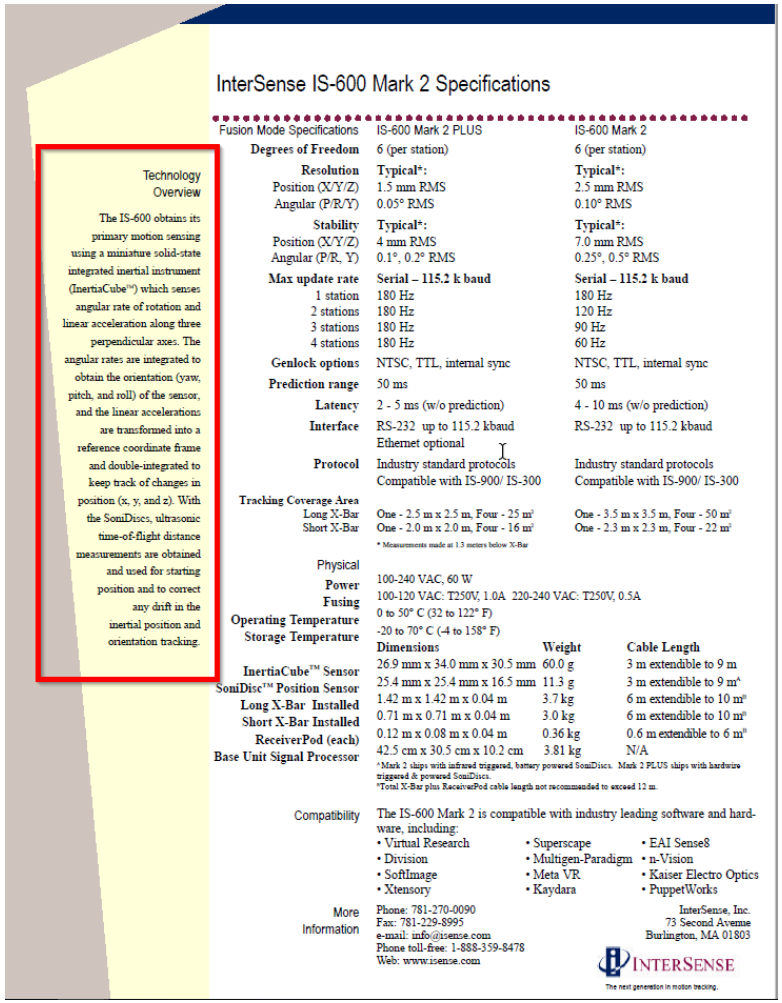
CLAIM 1	Intersense IS-600



InterSense IS-600 Mark 2 Specifications

Technology Overview

The IS-600 obtains its primary motion sensing using a miniature solid-state integrated inertial instrument (InertiaCube™) which senses angular rate of rotation and linear acceleration along three perpendicular axes. The angular rates are integrated to obtain the orientation (yaw, pitch, and roll) of the sensor, and the linear accelerations are transformed into a reference coordinate frame and double-integrated to keep track of changes in position (x, y, and z). With the SoniDiscs, ultrasonic time-of-flight distance measurements are obtained and used for starting position and to correct any drift in the inertial position and orientation tracking.

Fusion Mode Specifications	IS-600 Mark 2 PLUS	IS-600 Mark 2
Degrees of Freedom	6 (per station)	6 (per station)
Resolution	**Typical*:**	**Typical*:**
Position (X/Y/Z)	1.5 mm RMS	2.5 mm RMS
Angular (P/R/Y)	0.05° RMS	0.10° RMS
Stability	**Typical*:**	**Typical*:**
Position (X/Y/Z)	4 mm RMS	7.0 mm RMS
Angular (P/R, Y)	0.1°, 0.2° RMS	0.25°, 0.5° RMS
Max update rate	**Serial – 115.2 k baud**	**Serial – 115.2 k baud**
1 station	180 Hz	180 Hz
2 stations	180 Hz	120 Hz
3 stations	180 Hz	90 Hz
4 stations	180 Hz	60 Hz
Genlock options	NTSC, TTL, internal sync	NTSC, TTL, internal sync
Prediction range	50 ms	50 ms
Latency	2 - 5 ms (w/o prediction)	4 - 10 ms (w/o prediction)
Interface	RS-232 up to 115.2 kbaud Ethernet optional	RS-232 up to 115.2 kbaud
Protocol	Industry standard protocols Compatible with IS-900/ IS-300	Industry standard protocols Compatible with IS-900/ IS-300
Tracking Coverage Area		
Long X-Bar	One - 2.5 m x 2.5 m, Four - 25 m²	One - 3.5 m x 3.5 m, Four - 50 m²
Short X-Bar	One - 2.0 m x 2.0 m, Four - 16 m²	One - 2.3 m x 2.3 m, Four - 22 m²
	* Measurements made at 1.3 meters below X-Bar	

Physical			
Power	100-240 VAC, 60 W		
Fusing	100-120 VAC: T250V, 1.0A 220-240 VAC: T250V, 0.5A		
Operating Temperature	0 to 50° C (32 to 122° F)		
Storage Temperature	-20 to 70° C (-4 to 158° F)		
	Dimensions	**Weight**	**Cable Length**
InertiaCube™ Sensor	26.9 mm x 34.0 mm x 30.5 mm	60.0 g	3 m extendible to 9 m
SoniDisc™ Position Sensor	25.4 mm x 25.4 mm x 16.5 mm	11.3 g	3 m extendible to 9 m^
Long X-Bar Installed	1.42 m x 1.42 m x 0.04 m	3.7 kg	6 m extendible to 10 m*
Short X-Bar Installed	0.71 m x 0.71 m x 0.04 m	3.0 kg	6 m extendible to 10 m*
ReceiverPod (each)	0.12 m x 0.08 m x 0.04 m	0.36 kg	0.6 m extendible to 6 m*
Base Unit Signal Processor	42.5 cm x 30.5 cm x 10.2 cm	3.81 kg	N/A

^Mark 2 ships with infrared triggered, battery powered SoniDiscs. Mark 2 PLUS ships with hardwire triggered & powered SoniDiscs.
*Total X-Bar plus ReceiverPod cable length not recommended to exceed 12 m.

Compatibility

The IS-600 Mark 2 is compatible with industry leading software and hardware, including:

- Virtual Research
- Division
- SoftImage
- Xtensory
- Superscape
- Multigen-Paradigm
- Meta VR
- Kaydara
- EAI Sense8
- n-Vision
- Kaiser Electro Optics
- PuppetWorks

More Information

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Phone toll-free: 1-888-359-8478
Web: www.isense.com

InterSense, Inc.
73 Second Avenue
Burlington, MA 01803

INTERSENSE
The next generation in motion tracking.

InterSense IS-600 Ex. 1 at 2.

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CLAIM 1	Intersense IS-600

1.1.4 System Configuration

Figure 6 illustrates the configuration of the hybrid acoustic/inertial tracking system. The IS-600 hardware is essentially a superset of the IS-300 Series orientation tracking system, adding an ultrasonic range measurement system on top of the basic IS-300 Pro components. The drawing illustrates the IS-600 being used to track a helmet to which are attached an InertiaCube and two SoniDiscs. The rear SoniDisc has just received a trigger code matching its internal ID, and is in the process of emitting an omnidirectional acoustic pulse of 40 KHz energy. Only one SoniDisc is activated at a time.

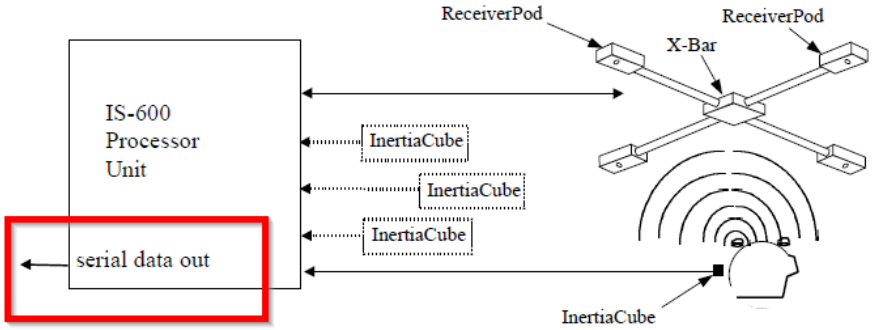

Figure 6: IS-600 HW diagram

The IS-600 has expansion capability up to 4 InertiaCubes and 8 SoniDiscs. Because these are packaged as separate modules, the user has the flexibility to configure the system for a very large variety of tracking tasks. The IS-600 also has several additional operating modes. These modes have different strengths and differing configuration requirements, as described in the following sections.

InterSense IS-600 Ex. 2 at 9.

See also Defendants' Invalidity Contentions for further discussion.

B. DEPENDENT CLAIM 2

CLAIM 2	Intersense IS-600
[2] The method of claim 1, further comprising mounting a virtual reality display on the user's head that contains one or more objects.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 1, further comprising mounting a virtual reality display on the user's head that contains one or more objects. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*:

Exhibit B-16

CLAIM 2	Intersense IS-600

Perceptual Enhancement Level

In order to provide the best performance for a large range of various applications, three levels of perceptual enhancement are available. None of the modes introduces any additional latency.

40

Mode 0 provides the best accuracy. The inertial tracker uses gyros to measure angular rotation rates for computing the sensor's orientation. To compensate for the gyroscopic drift, depending on the configuration, the tracker may use accelerometers, magnetometers or SoniDiscs to measure the actual physical orientation of the sensor. That data is then used to compute the necessary correction. In Mode 0 correction adjustments are made immediately, no jitter reduction algorithms are used. This results in somewhat jumpy output (not recommended for head tracking) but with lower RMS error. Use this mode for accuracy testing or for any application that requires best accuracy.

Mode 1 provides accuracy similar to that of mode 0, with an addition of a jitter reduction algorithm. This algorithm reduces the accuracy by only a small amount and does not add any latency to the measurements.

Mode 2 is recommended for use with HMD or other immersive applications. The drift correction adjustments are made smoothly and only while the sensor is moving, so as to be transparent to the user.

Intersense IS-600 Ex. 2 at 40–41.

See Disclosures with respect to Claim 1 *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

C. DEPENDENT CLAIM 3

CLAIM 3	Intersense IS-600
[3] The method of claim 2, further comprising using said tracked position to display in the virtual reality display an interaction of said body part with an object of said one or more objects.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 2, further comprising using said tracked position to display in the virtual reality display an interaction of said body part with an object of said one or more objects. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 2, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

D. DEPENDENT CLAIM 4

CLAIM 4	Intersense IS-600
[4] The method of claim 3, wherein said interaction comprises virtual direct manipulation of said object by the user.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 3, wherein said interaction comprises virtual direct manipulation of said object by the user. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 3, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

E. DEPENDENT CLAIM 5

CLAIM 5	Intersense IS-600
[5] The method of claim 3, wherein said	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 3, wherein said interaction comprises a scaled-world grab. In the alternative, this element

CLAIM 5	Intersense IS-600
interaction comprises a scaled-world grab.	would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 3, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

F. DEPENDENT CLAIM 8

CLAIM 8	Intersense IS-600
[8] The method of claim 3, wherein said object includes a second body part, and wherein displaying said interaction comprises displaying a relative position between said body part and said second body part.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 3, wherein said object includes a second body part, and wherein displaying said interaction comprises displaying a relative position between said body part and said second body part. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 3, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

G. DEPENDENT CLAIM 9

CLAIM 9	Intersense IS-600
[9] The method of claim 3, further comprising, in response to the user virtually grabbing an object displayed in the virtual reality display,	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 3, further comprising, in response to the user virtually grabbing an object displayed in the virtual reality display, moving the user toward the object in the virtual reality display. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art.

CLAIM 9	Intersense IS-600
moving the user toward the object in the virtual reality display.	*See* Disclosures with respect to Claim 3, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

H. DEPENDENT CLAIM 10

CLAIM 10	Intersense IS-600
[10] The method of claim 3, wherein the virtual reality display has a frame of reference and further comprising determining a change in position of the user's head and, in response to said change in position, changing the viewpoint of the virtual reality display relative to the frame of reference.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 3, wherein the virtual reality display has a frame of reference and further comprising determining a change in position of the user's head and, in response to said change in position, changing the viewpoint of the virtual reality display relative to the frame of reference. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 3, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

I. DEPENDENT CLAIM 11

CLAIM 11	Intersense IS-600
[11] The method of claim 10, wherein determining a change in position comprises	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 10, wherein determining a change in position comprises determining a change in the position of the user's head relative to said body part. In the alternative, this element would be obvious over Intersense IS-

CLAIM 11	Intersense IS-600
determining a change in the position of the user's head relative to said body part.	600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 10, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

J. DEPENDENT CLAIM 16

CLAIM 16	Intersense IS-600
[16] The method of claim 1, further comprising using signals obtained from said sourceless orientation tracker to compute a distance traveled by said user in a virtual reality environment; and generating data representative of such distance.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 1, further comprising using signals obtained from said sourceless orientation tracker to compute a distance traveled by said user in a virtual reality environment, and generating data representative of such distance. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

K. DEPENDENT CLAIM 17

CLAIM 17	Intersense IS-600
[17.a] The method of claim 1, further comprising:	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 1, further comprising providing a virtual reality display having a frame of reference. In the

Exhibit B-16

CLAIM 17	Intersense IS-600
(a) providing a virtual reality display having a frame of reference;	alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.
[17.b] (b) displaying in said virtual reality display an object associated with said body part;	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, displaying in said virtual reality display an object associated with said body part. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.
[17.c] (c) providing an input mechanism for receiving an input from said user;	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, providing an input mechanism for receiving an input from said user. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.
[17.d] (d) operating said virtual reality display in a first mode comprising, in response to a change in said tracked position, displaying a change in the apparent position of said object relative to said frame of reference; and	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, operating said virtual reality display in a first mode comprising, in response to a change in said tracked position, displaying a change in the apparent position of said object relative to said frame of reference. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.
[17.e] (e) in response to an input from said input	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, in response to an input from said input device, operating said virtual reality display in a second mode, comprising

CLAIM 17	Intersense IS-600
device, operating said virtual reality display in a second mode, comprising in response to a change in said tracked position, displaying a constant apparent position of said object relative to said frame of reference.	in response to a change in said tracked position, displaying a constant apparent position of said object relative to said frame of reference. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

L. DEPENDENT CLAIM 18

CLAIM 18	Intersense IS-600
[18] The method of claim 17 wherein, in said second mode, in response to a change in said tracked position, the viewpoint of said virtual reality display changes relative to said frame of reference.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 17 wherein, in said second mode, in response to a change in said tracked position, the viewpoint of said virtual reality display changes relative to said frame of reference. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

M. DEPENDENT CLAIM 20

CLAIM 20	Intersense IS-600
[20] The method of claim 1, further comprising providing a head mounted display including a body stabilized information cockpit and displaying data to a user using such display.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 1, further comprising providing a head mounted display including a body stabilized information cockpit and displaying data to a user using such display. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

N. DEPENDENT CLAIM 21

CLAIM 21	Intersense IS-600
[21] The method of claim 20, wherein said information cockpit comprises a clear windshield.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 20, wherein said information cockpit comprises a clear windshield. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 20, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

O. DEPENDENT CLAIM 22

CLAIM 22	Intersense IS-600
[22] The method of claim 21, further comprising, in response	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 21, further comprising, in response to user selection of an object of the one or more objects, displaying an information display window in the head mounted display. In the alternative, this element would be

CLAIM 22	Intersense IS-600
to user selection of an object of the one or more objects, displaying an information display window in the head mounted display.	obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 21, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

P. DEPENDENT CLAIM 23

CLAIM 23	Intersense IS-600
[23] The method of claim 22, wherein said information cockpit comprises a clear windshield and further comprising fixing said information display window to said clear windshield.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 22, wherein said information cockpit comprises a clear windshield and further comprising fixing said information display window to said clear windshield. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 22, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

Q. DEPENDENT CLAIM 24

CLAIM 24	Intersense IS-600
[24] The method of claim 20, wherein said information cockpit	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 20, wherein said information cockpit comprises one or more objects. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art.

CLAIM 24	Intersense IS-600
comprises one or more objects.	*See* Disclosures with respect to Claim 24, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

R. DEPENDENT CLAIM 25

CLAIM 25	Intersense IS-600
[25] The method of claim 24, further comprising using said tracked position to determine that the user has selected an object of the one or more objects.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 24, further comprising using said tracked position to determine that the user has selected an object of the one or more objects. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 24, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

S. DEPENDENT CLAIM 26

CLAIM 26	Intersense IS-600
[26] The method of claim 24, further comprising modifying the appearance of an object of the one or more objects in response to a change in said tracked position.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 24, further comprising modifying the appearance of an object of the one or more objects in response to a change in said tracked position. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 24, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

T. DEPENDENT CLAIM 27

CLAIM 27	Intersense IS-600
[27] The method of claim 26, wherein modifying the appearance of the object comprises changing the apparent distance of the object from the user in the display.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 26, wherein modifying the appearance of the object comprises changing the apparent distance of the object from the user in the display. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 26, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

U. DEPENDENT CLAIM 28

CLAIM 28	Intersense IS-600
[28] The method of claim 27, wherein the body part is the user's hand, and wherein the change in said tracked position results from the user virtually manipulating the object.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 27, wherein the body part is the user's hand, and wherein the change in said tracked position results from the user virtually manipulating the object. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 27, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

V. DEPENDENT CLAIM 29

CLAIM 29	Intersense IS-600
[29] The method of claim 28, wherein said	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 28, wherein said information cockpit includes a clear windshield and further comprising

CLAIM 29	Intersense IS-600
information cockpit includes a clear windshield and further comprising attaching said object to said windshield by virtually manipulating said object.	attaching said object to said windshield by virtually manipulating said object. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 28, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

W. DEPENDENT CLAIM 30

CLAIM 30	Intersense IS-600
[30] The method of claim 26, wherein said object is a cursor.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 26, wherein said object is a cursor. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 26, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

X. DEPENDENT CLAIM 31

CLAIM 31	Intersense IS-600
[31] The method of claim 30, wherein said change in said tracked position comprises a component in a plane, and wherein the appearance of the cursor	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 30, wherein said change in said tracked position comprises a component in a plane, and wherein the appearance of the cursor is modified in response to said change by moving it a distance based on magnitude and direction of said planar component. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art.

CLAIM 31	Intersense IS-600
is modified in response to said change by moving it a distance based on magnitude and direction of said planar component.	*See* Disclosures with respect to Claim 31, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

Y. DEPENDENT CLAIM 32

CLAIM 32	Intersense IS-600
[32] The method of claim 20, wherein said information cockpit comprises one or more virtual instruments.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 20, wherein said information cockpit comprises one or more virtual instruments. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 20, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

Z. DEPENDENT CLAIM 35

CLAIM 35	Intersense IS-600
[35] The method of claim 20, further comprising providing in said display indicia of a route toward a destination.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 20, further comprising providing in said display indicia of a route toward a destination. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 20, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

AA. DEPENDENT CLAIM 37

CLAIM 37	Intersense IS-600
[37] The method of claim 20, further comprising detecting a predefined hand gesture of the user and, in response to said hand gesture, resetting the heading direction of said cockpit.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 20, further comprising detecting a predefined hand gesture of the user and, in response to said hand gesture, resetting the heading direction of said cockpit. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 20, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

BB. DEPENDENT CLAIM 38

CLAIM 38	Intersense IS-600
[38] The method of claim 1, further comprising sequentially positioning said localized feature at a first and then a second location, using said position tracker to determine positions of said first and second locations, and computing a distance between said positions, and generating data representative of such distance.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 1, further comprising sequentially positioning said localized feature at a first and then a second location, using said position tracker to determine positions of said first and second locations, and computing a distance between said positions, and generating data representative of such distance. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

CC. INDEPENDENT CLAIM 40

CLAIM 40	Intersense IS-600
[40.pre] A method comprising:	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, a method. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.
[40.a] mounting a first sourceless orientation tracker on a user's head;	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, mounting a first sourceless orientation tracker on a user's head. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*:

Exhibit B-16

CLAIM 40	Intersense IS-600

IS-600 Mark 2

- *Fast & Smooth performance*
- *6-DOF Motion Prediction*
- *Wireless SoniDiscs™*
- *Immune to Magnetic Interference*

IS-600 Mark 2 PLUS

- *Upgraded Pentium™ Processor*
- *State-of -the art Ultrasonics*
- *Improved Resolution & Off-axis Accuracy*
- *Four tracked stations at 180 Hz*

IS-600 Mark 2 Precision Motion Trackers

Robust 6 degree-of-freedom motion tracking for simulation and training.

The IS-600 Mark 2 line delivers high-fidelity 6 Degree-of-Freedom (6-DOF) position and orientation tracking without the issues associated with other tracking technologies. Utilizing a hybrid of inertial and ultrasonic sensing technologies, the IS-600 Mark 2 achieves performance and robustness superior to any single-technology tracking device.

Superior Accuracy and Robustness
The IS-600 family uses InterSense's SensorFusion software to obtain superior position and orientation resolution and stability. Position tracking performance is enhanced by combining inertial sensors with ultrasonic drift correction, resulting in vastly improved update rates, resolution, and immunity to environmental interference.

Fast and Jitter-Free
The InterSense IS-600 design virtually eliminates the lag and jitter common to other systems, thus overcoming issues that are the source of simulator sickness in immersive head-mounted display applications.

Motion Prediction
The IS-600 can predict angular & position motion up to 50 ms, compensating for graphics rendering delays and minimizing simulator lag.

Four Operating Modes
GEOS™ Mode: Gyroscopic Earth-Stabilized Orientation Sensing for smooth sourceless 3-DOF orientation tracking with internal update rates up to 500 Hz.

PULSAR™ Mode: Pulsed Acoustic Ranging provides 3-DOF ultrasonic position tracking. Can be configured to run either hard-wired or wireless.

DUAL Mode: 6-DOF orientation and position tracking. The sensors operate independent of each other.

FUSION Mode: The best 6-DOF orientation and position tracking, using sensor fusion algorithms to combine inertial and ultrasonic measurements.

Distortion-Free
InterSense's patented inertial sensing technology is not susceptible to the electromagnetic interference common in other tracking systems, allowing the IS-600 to deliver smooth, steady performance, even in noisy, metal-cluttered environments.

Installation Flexibility
The X-bar is modular in design with detachable ReceiverPods, allowing custom configurations such as inside auto and flight simulators.

IS-600 Mark 2 PLUS Features
The Mark 2 PLUS offers millimeter resolution, improved stability, and increased noise immunity from environmental interference.

The Pentium processor allows four fusion mode stations to track simultaneously at 180 Hz.

Hardwired SoniDiscs provide maintenance free operation with a battery powered option available for configuration flexibility.

INTERSENSE

Intersense IS-600 Ex. 1 at 1.

Exhibit B-16

CLAIM 40	Intersense IS-600

1.1 Hardware System Description

1.1.1 InertiaCube™ integrated inertial instrument

Both the sourceless orientation tracking and the hybrid 6-DOF tracking product configurations make use of an ultra-miniature smart sensor module called the InertiaCube. The InertiaCube is a monolithic part based on micro-electro-mechanical systems (MEMS) technology involving no spinning wheels that might generate noise, inertial forces and mechanical failures. The InertiaCube simultaneously measures 9 physical properties, namely angular rates, linear accelerations, and magnetic field components along all 3 axes. Micro-miniature vibrating elements are employed to measure all the angular rate components and linear accelerations, with integral electronics and solid-state magnetometers. The magnetometers are included for optional yaw drift correction in the sourceless inertial orientation mode only. The geometry and composition of these elements are proprietary, but the functional performance of the multisensor unit can be understood sufficiently by reference to the equivalent diagram in Figure 1.

Intersense IS-600 Ex. 2 at 6.

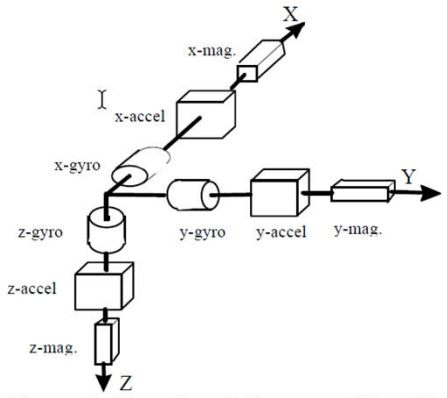

Figure 1: Functional diagram of InertiaCube

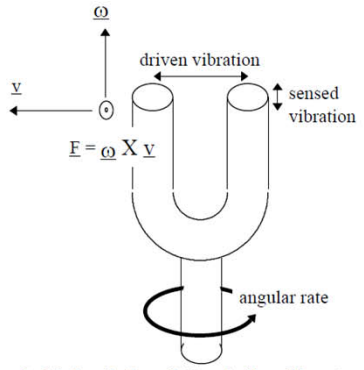

Figure 2: Principle of Coriolis vibratory gyroscope

Intersense IS-600 Ex. 2 at 7.

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CLAIM 40	Intersense IS-600

1.1.4 System Configuration

Figure 6 illustrates the configuration of the hybrid acoustic/inertial tracking system. The IS-600 hardware is essentially a superset of the IS-300 Series orientation tracking system, adding an ultrasonic range measurement system on top of the basic IS-300 Pro components. The drawing illustrates the IS-600 being used to track a helmet to which are attached an InertiaCube and two SoniDiscs. The rear SoniDisc has just received a trigger code matching its internal ID, and is in the process of emitting an omnidirectional acoustic pulse of 40 KHz energy. Only one SoniDisc is activated at a time.

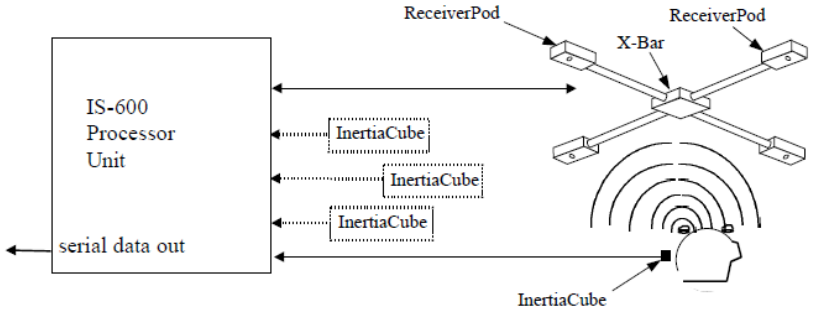

Figure 6: IS-600 HW diagram

The IS-600 has expansion capability up to 4 InertiaCubes and 8 SoniDiscs. Because these are packaged as separate modules, the user has the flexibility to configure the system for a very large variety of tracking tasks. The IS-600 also has several additional operating modes. These modes have different strengths and differing configuration requirements, as described in the following sections.

Intersense IS-600 Ex. 2 at 9.

Exhibit B-16

CLAIM 40	Intersense IS-600
	Perceptual Enhancement Level In order to provide the best performance for a large range of various applications, three levels of perceptual enhancement are available. None of the modes introduces any additional latency. 40 Mode 0 provides the best accuracy. The inertial tracker uses gyros to measure angular rotation rates for computing the sensor's orientation. To compensate for the gyroscopic drift, depending on the configuration, the tracker may use accelerometers, magnetometers or SoniDiscs to measure the actual physical orientation of the sensor. That data is then used to compute the necessary correction. In Mode 0 correction adjustments are made immediately, no jitter reduction algorithms are used. This results in somewhat jumpy output (not recommended for head tracking) but with lower RMS error. Use this mode for accuracy testing or for any application that requires best accuracy. Mode 1 provides accuracy similar to that of mode 0, with an addition of a jitter reduction algorithm. This algorithm reduces the accuracy by only a small amount and does not add any latency to the measurements. Mode 2 is recommended for use with HMD or other immersive applications. The drift correction adjustments are made smoothly and only while the sensor is moving, so as to be transparent to the user. Intersense IS-600 Ex. 2 at 40–41. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.
[40.b] mounting a second sourceless orientation tracker on a body part of	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, mounting a second sourceless orientation tracker on a body part of the user other than the user's head. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art.

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CLAIM 40	Intersense IS-600
the user other than the user's head; and	*See, e.g.*: **2 Specifications and Performance Characteristics** **Performance Specifications** The following performance specifications can be achieved when tracking one station in Fusion Mode in the region directly below the X-Bar. There will be a graceful degradation of performance when tracking multiple stations or when tracking in the outer extents of the working volume. **Specifications** Maximum Angular Rate: 1200°/sec Angular Resolution: 0.05° RMS Angular Accuracy: 0.2° RMS Maximum Linear Velocity: 15'/sec Translation Resolution: 1.5mm RMS Translation Accuracy: 4mm RMS Prediction: 0-50ms Number of InertiaCube Sensors: up to 4 Number of SoniDisc Beacons: up to 8 Orientation Update Rate: up to 500Hz Position Update Rate: 180Hz Interface: RS-232C with selectable baud rates to 115,200 Protocol: Compatible with industry-standard protocol (FASTRAK™) Max. System Configurations: GEOS 4 orientation-only stations; PULSAR 8 position-only stations; DUAL 4 6-DOF stations; FUSION 4 6-DOF stations Or any combination of Operating Modes that make use of 4 InertiaCubes and 8 SoniDiscs Intersense IS-600 Ex. 2 at 15. *See* Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.
[40.c] utilizing angular rate and linear	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, utilizing angular rate and linear acceleration signals from said first and second trackers to derive a differential

Exhibit B-16

CLAIM 40	Intersense IS-600
acceleration signals from said first and second trackers to derive a differential inertial signal representative of a motion of the body part relative to the head.	inertial signal representative of a motion of the body part relative to the head. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*:

Exhibit B-16

CLAIM 40	Intersense IS-600

1.2.5 6-DOF Fusion Mode

The 6-DOF Fusion Mode works like an inertial navigation system with acoustic range measurements used to curtail drift in both position and orientation. Figure 9 illustrates the signal flow in this mode. The same InertiaCube is used as in GEOS mode, but its outputs are processed somewhat differently. The angular rate signals are integrated in a direct manner to obtain orientation, as with GEOS. The linear acceleration signals are used simultaneously for two separate purposes. First, they are transformed from the InertiaCube body frame (B-frame) into a locally-level navigation frame (N-frame). The gravitation constant, g, is then subtracted from the vertical acceleration component in order to cancel the unwanted effects of gravity on the accelerometer triad. Then the remaining acceleration vector is double integrated to track changes in the N-frame position. In a second usage, the B-frame accelerations are also fed into the error estimator to help cancel pitch and roll drift, analogous to the way they are used in GEOS mode. Finally, note that the magnetic field components sensed by the InertiaCube are not used at all in Fusion Mode.

Instead, the yaw drift is corrected by the acoustic range measurements simultaneously with the position drift. This is why it is necessary to have at least two SoniDiscs associated with a Fusion Mode station. Although what happens inside the extended Kalman filter is actually quite different, the simplified explanation is that the acoustic range measurements can be used to first localize one SoniDisc, then the second, find the vector connecting them and determine a heading direction from it with which to reset the yaw drift.

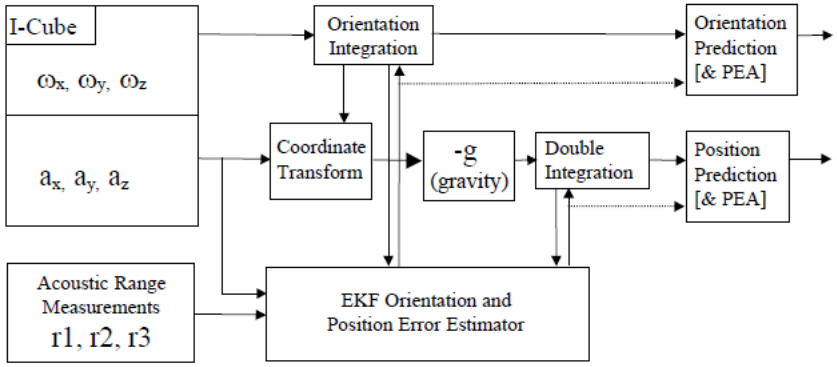

Figure 9: Fusion Mode tracking algorithm

Intersense IS-600 Ex. 2 at 13.

Exhibit B-16

CLAIM 40	Intersense IS-600
	See Disclosures with respect to Claim 1, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

DD. DEPENDENT CLAIM 41

CLAIM 41	Intersense IS-600
[41] The method of claim 40, further comprising using signals from said first tracker to obtain a sourceless measurement of the orientation of the user's head.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 40, further comprising using signals from said first tracker to obtain a sourceless measurement of the orientation of the user's head. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See, e.g.*:

Exhibit B-16

CLAIM 41	Intersense IS-600

IS-600 Mark 2

- *Fast & Smooth performance*
- *6-DOF Motion Prediction*
- *Wireless SoniDiscs™*
- *Immune to Magnetic Interference*

IS-600 Mark 2 PLUS

- *Upgraded Pentium™ Processor*
- *State-of -the art Ultrasonics*
- *Improved Resolution & Off-axis Accuracy*
- *Four tracked stations at 180 Hz*

IS-600 Mark 2 Precision Motion Trackers

Robust 6 degree-of-freedom motion tracking for simulation and training.

The IS-600 Mark 2 line delivers high-fidelity 6 Degree-of-Freedom (6-DOF) position and orientation tracking without the issues associated with other tracking technologies. Utilizing a hybrid of inertial and ultrasonic sensing technologies, the IS-600 Mark 2 achieves performance and robustness superior to any single-technology tracking device.

Superior Accuracy and Robustness
The IS-600 family uses InterSense's SensorFusion software to obtain superior position and orientation resolution and stability. Position tracking performance is enhanced by combining inertial sensors with ultrasonic drift correction, resulting in vastly improved update rates, resolution, and immunity to environmental interference.

Fast and Jitter-Free
The InterSense IS-600 design virtually eliminates the lag and jitter common to other systems, thus overcoming issues that are the source of simulator sickness in immersive head-mounted display applications.

Motion Prediction
The IS-600 can predict angular & position motion up to 50 ms, compensating for graphics rendering delays and minimizing simulator lag.

Four Operating Modes
GEOS™ Mode: Gyroscopic Earth-Stabilized Orientation Sensing for smooth sourceless 3-DOF orientation tracking with internal update rates up to 500 Hz.

PULSAR™ Mode: Pulsed Acoustic Ranging provides 3-DOF ultrasonic position tracking. Can be configured to run either hard-wired or wireless.

DUAL Mode: 6-DOF orientation and position tracking. The sensors operate independent of each other.

FUSION Mode: The best 6-DOF orientation and position tracking, using sensor fusion algorithms to combine inertial and ultrasonic measurements.

Distortion-Free
InterSense's patented inertial sensing technology is not susceptible to the electromagnetic interference common in other tracking systems, allowing the IS-600 to deliver smooth, steady performance, even in noisy, metal-cluttered environments.

Installation Flexibility
The X-bar is modular in design with detachable ReceiverPods, allowing custom configurations such as inside auto and flight simulators.

IS-600 Mark 2 PLUS Features
The Mark 2 PLUS offers millimeter resolution, improved stability, and increased noise immunity from environmental interference.

The Pentium processor allows four fusion mode stations to track simultaneously at 180 Hz.

Hardwired SoniDiscs provide maintenance free operation with a battery powered option available for configuration flexibility.

INTERSENSE

Intersense IS-600 Ex. 1 at 1.

Exhibit B-16

CLAIM 41	Intersense IS-600

1.1 Hardware System Description

1.1.1 InertiaCube™ integrated inertial instrument

Both the sourceless orientation tracking and the hybrid 6-DOF tracking product configurations make use of an ultra-miniature smart sensor module called the InertiaCube. The InertiaCube is a monolithic part based on micro-electro-mechanical systems (MEMS) technology involving no spinning wheels that might generate noise, inertial forces and mechanical failures. The InertiaCube simultaneously measures 9 physical properties, namely angular rates, linear accelerations, and magnetic field components along all 3 axes. Micro-miniature vibrating elements are employed to measure all the angular rate components and linear accelerations, with integral electronics and solid-state magnetometers. The magnetometers are included for optional yaw drift correction in the sourceless inertial orientation mode only. The geometry and composition of these elements are proprietary, but the functional performance of the multisensor unit can be understood sufficiently by reference to the equivalent diagram in Figure 1.

Intersense IS-600 Ex. 2 at 6.

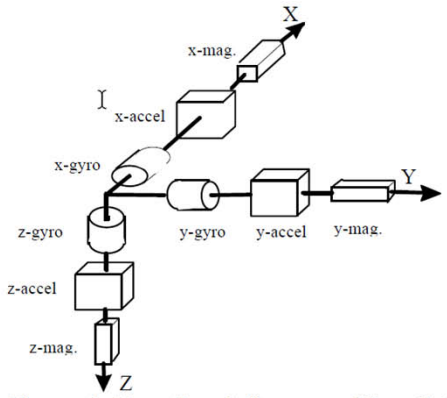

Figure 1: Functional diagram of InertiaCube

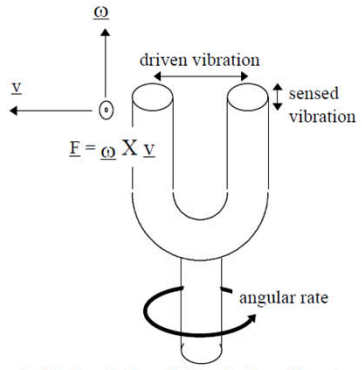

Figure 2: Principle of Coriolis vibratory gyroscope

Intersense IS-600 Ex. 2 at 7.

Exhibit B-16

CLAIM 41	Intersense IS-600

1.1.4 System Configuration

Figure 6 illustrates the configuration of the hybrid acoustic/inertial tracking system. The IS-600 hardware is essentially a superset of the IS-300 Series orientation tracking system, adding an ultrasonic range measurement system on top of the basic IS-300 Pro components. The drawing illustrates the IS-600 being used to track a helmet to which are attached an InertiaCube and two SoniDiscs. The rear SoniDisc has just received a trigger code matching its internal ID, and is in the process of emitting an omnidirectional acoustic pulse of 40 KHz energy. Only one SoniDisc is activated at a time.

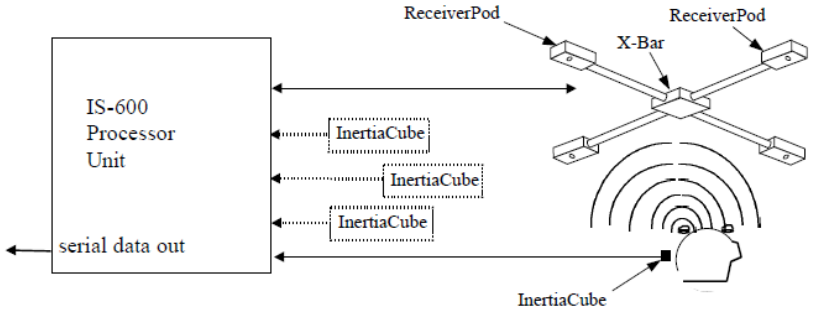

Figure 6: IS-600 HW diagram

The IS-600 has expansion capability up to 4 InertiaCubes and 8 SoniDiscs. Because these are packaged as separate modules, the user has the flexibility to configure the system for a very large variety of tracking tasks. The IS-600 also has several additional operating modes. These modes have different strengths and differing configuration requirements, as described in the following sections.

Intersense IS-600 Ex. 2 at 9.

Exhibit B-16

CLAIM 41	Intersense IS-600

Perceptual Enhancement Level

In order to provide the best performance for a large range of various applications, three levels of perceptual enhancement are available. None of the modes introduces any additional latency.

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Mode 0 provides the best accuracy. The inertial tracker uses gyros to measure angular rotation rates for computing the sensor's orientation. To compensate for the gyroscopic drift, depending on the configuration, the tracker may use accelerometers, magnetometers or SoniDiscs to measure the actual physical orientation of the sensor. That data is then used to compute the necessary correction. In Mode 0 correction adjustments are made immediately, no jitter reduction algorithms are used. This results in somewhat jumpy output (not recommended for head tracking) but with lower RMS error. Use this mode for accuracy testing or for any application that requires best accuracy.

Mode 1 provides accuracy similar to that of mode 0, with an addition of a jitter reduction algorithm. This algorithm reduces the accuracy by only a small amount and does not add any latency to the measurements.

Mode 2 is recommended for use with HMD or other immersive applications. The drift correction adjustments are made smoothly and only while the sensor is moving, so as to be transparent to the user.

Intersense IS-600 Ex. 2 at 40–41.

See Disclosures with respect to Claim 40, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

EE. DEPENDENT CLAIM 42

CLAIM 42	Intersense IS-600
[42] The method of claim 41, further comprising using signals from said first and second trackers to track both the position and orientation of the body part.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 41, further comprising using signals from said first and second trackers to track both the position and orientation of the body part. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 41, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

FF. DEPENDENT CLAIM 43

CLAIM 43	Intersense IS-600
[43] The method of claim 42, further comprising using relative range measurements between said head and said body part to correct drift in said tracking of the position and orientation of the body part.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 42, further comprising using relative range measurements between said head and said body part to correct drift in said tracking of the position and orientation of the body part. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 42, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.

Exhibit B-16

GG. DEPENDENT CLAIM 44

CLAIM 44	Intersense IS-600
[44] The method of claim 43, further comprising providing signals to a haptic feedback device based on said tracked position or said tracked orientation.	At least under Plaintiffs' apparent infringement theory, Intersense IS-600 discloses, either expressly or inherently, the method of claim 43, further comprising providing signals to a haptic feedback device based on said tracked position or said tracked orientation. In the alternative, this element would be obvious over Intersense IS-600 in light of the other references disclosed in Defendants' Invalidity Contentions and/or the knowledge of one of ordinary skill in the art. *See* Disclosures with respect to Claim 43, *supra*; *see also* Defendants' Invalidity Contentions for further discussion.